Statistical time-division multiplexing (STDM)

STDM is an advanced version of TDM in which both the address of the terminal and the data itself are transmitted together for better routing. Using STDM allows bandwidth to be split over 1 line. Many college and corporate campuses use this type of TDM to logically distribute bandwidth.

Statistical time division multiplexing (**STDM**) is one method for transmitting several types of data simultaneously across a single transmission cable or line.

STDM is often used for managing data being transmitted via a local area network (LAN) or a wide area network (WAN). In these situations, the data is often simultaneously transmitted from any number of input devices attached to the network, including computers, printers, or fax machines.

STDM can also be used in telephone switchboard settings to manage the simultaneous calls going to or coming from multiple, internal telephone lines.

The concept behind STDM is similar to TDM, or time division multiplexing. TDM allows multiple users or input devices to transmit or receive data simultaneously by assigning each device the same, fixed amount of time on one of many "channels" available on the cable or line. The TDM method works well in many cases, but does not always account for the varying data transmission needs of different devices or users.

In comparison to TDM, the STDM method analyzes statistics related to the typical workload of each input device (printer, fax, computer) and determines on-the-fly how much time each device should be allocated for data transmission on the cable or line.

In the above example, STDM would allocate more time to the group printer, based on its past and current transmission needs and less time to the data-entry computer. Many believe the STDM method is a more efficient use of total bandwidth available than the TDM method.

The main statistics used in STDM are:

Each input device's peak data rates (in kbps, or kilobytes per second).

Statistical multiplexing is facilitated through **packet mode** or **packet oriented** communication, which amongst others is utilized in packet switched computer networks.

Each stream is divided into packets that normally are delivered asynchronously in a first come first serve fashion.

Alternatively, the packets may be delivered according to some scheduling discipline for fair queuing or differentiated and/or guaranteed quality of service.

Statistical multiplexing allows the bandwidth to be divided arbitrarily among a variable number of channels (while the number of channels and the channel data rate are fixed in TDM).

Statistical multiplexing ensures that slots will not be wasted (whereas TDM can waste slots).

Channel identification

In statistical multiplexing, each packet or frame contains a channel/data stream identification number, or (in the case of datagram communication) complete destination address information.